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**JUNGLE AND
DESERT**

EMERGENCIES

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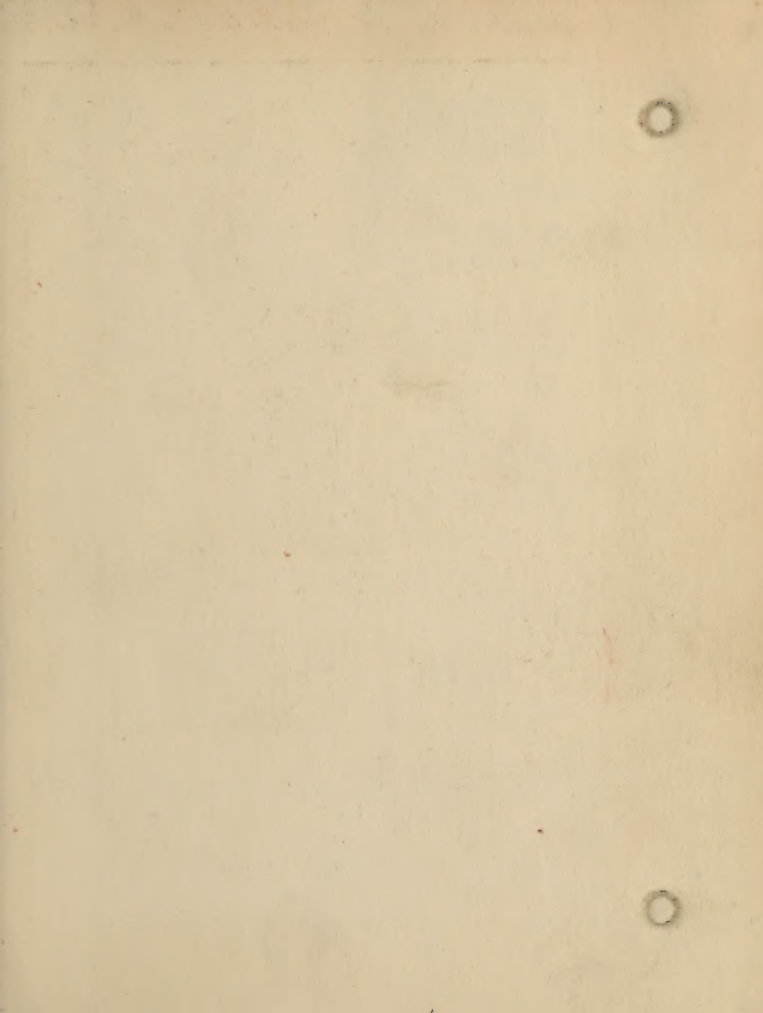


Section

** War coll -*
Acc. & Emergencies

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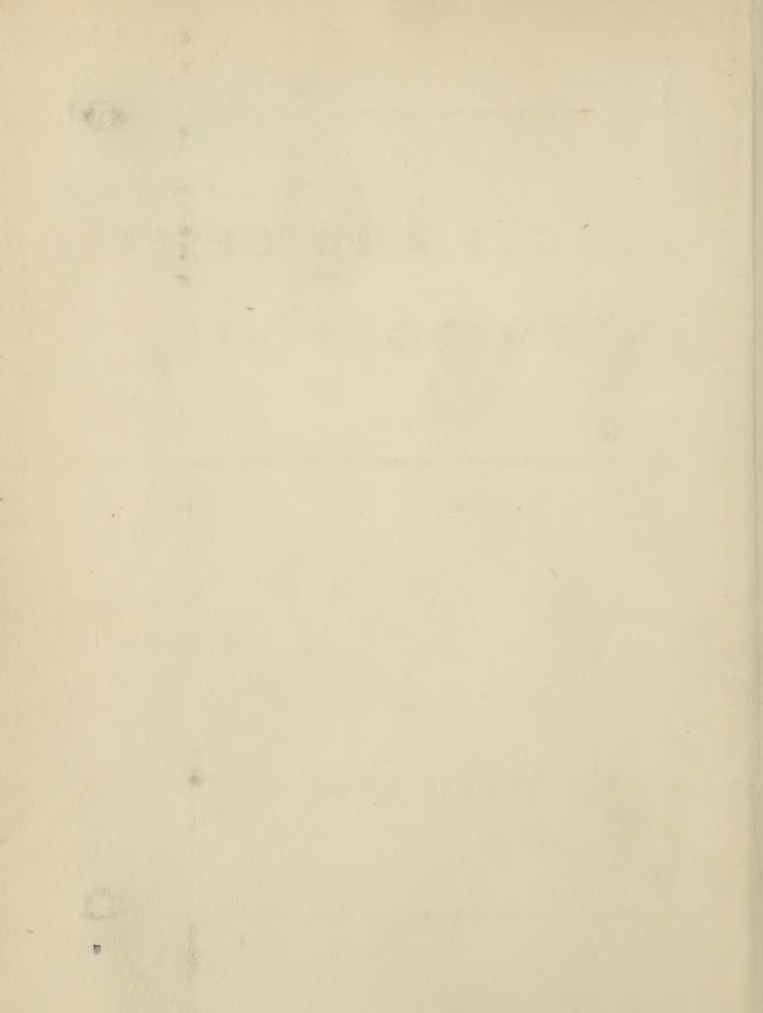
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JUNGLE AND DESERT EMERGENCIES



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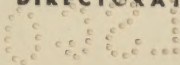
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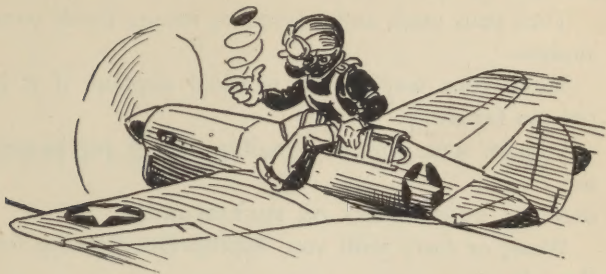
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Ast chief
of air stp
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**DIRECTORATE OF AIR TRAFFIC AND SAFETY,
AND DIRECTORATE OF SAFETY EDUCATION**



FOREWORD ON FORETHOUGHT



TO BAIL OR NOT TO BAIL

NORMALLY, A CONTROLLED CRASH LANDING, WITH FUEL TO SPARE, IS PREFERABLE TO BAILING OUT BECAUSE:

The intact outline of your airplane will help searching parties to find you.

The airplane will provide shelter.

Residual fuel and oil can be drained and burned for warmth and to supply smoke or signals to guide searchers.

Material will be available for improvised sun helmets, fish spears, shelter, bush knives, signalling devices, etc.

IF, HOWEVER, IT IS NECESSARY TO BAIL OUT, YOU SHOULD ATTEMPT TO :

Tuck your maps and emergency rations inside your clothes.

Make your way to the wrecked airplane if it is not too far away.

Prepare some sort of signalling device for instant use.

GENERAL SUGGESTIONS ON PREPAREDNESS:

Wear, or carry with you, appropriate clothing for the trip.

Wear shoes that you can walk home in.

JUNGLE

DON'T RUSH

THINK THINGS OUT, THEN ACT

SLEEP AND FOOD ARE IMPORTANT,

DON'T FOREGO THEM IN YOUR

EAGERNESS TO GET OUT

DON'T FEAR THE JUNGLE

A man can live for weeks in the jungle with safety if he will avoid panic and use his head.

GOOD FOOD AND GOOD WATER are fairly plentiful in the jungle if you know where to look for them.

MOST WILD ANIMALS won't bother you unless you bother them.

There is little more chance of being bitten by a POISONOUS SNAKE than there is of being struck by lightning back home. There are no poisonous snakes in Polynesia and in Malaysia they are rare.

With the exception of those of New Guinea and Assam, JUNGLE NATIVES will be friendly if you make friendly approaches to them. DON'T TRY TO BULLY THEM.

MALARIA is your worst enemy. If you have your first-aid kit, start immediately to take preventive doses of Quinine or Atabrine.

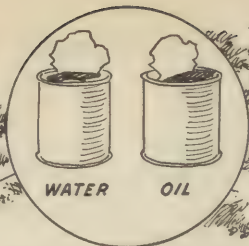
IF YOU WERE ABLE to land or crash-land your plane in an open clearing, plan to stay with it for a few days. If you crash-landed in the trees, make a temporary camp near the wreckage. If you were following your normal flight course when you were forced down, your plane will be much easier for searchers to locate than you will be.

In a multi-place plane, good quarters can be set up inside the plane by covering the door and cockpit openings with mosquito netting or with your parachutes.

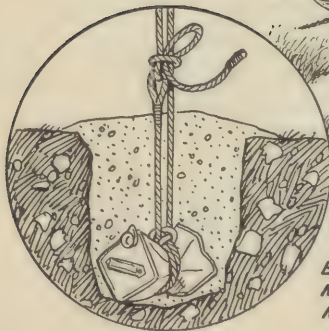
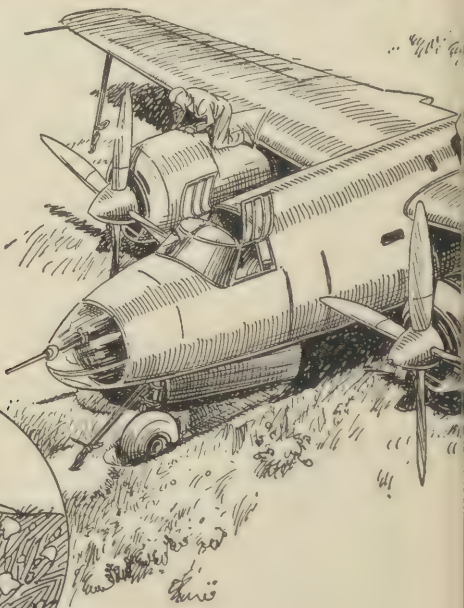
SIGNALS

If your plane is intact, and there is some chance that you may be able to fly it out, your first job is to secure it by digging hub-deep holes for the landing wheels and staking down the wings and tail. If you have no staking kit, improvised stakes can be made by burying oil cans or two or three-foot sections of tree branches.

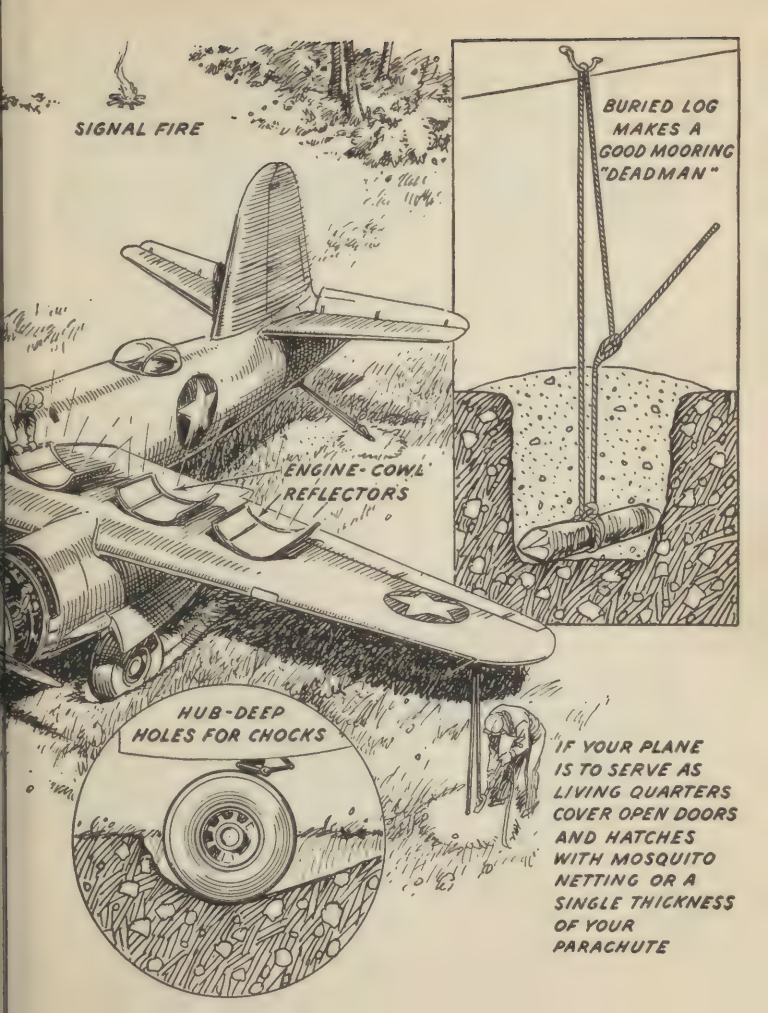
Your second job is to attempt to establish radio contact and to set up signals.



**SIGNAL FIRE -
OIL FOR SMUDGE,
WATER FOR WHITE
CLOUDS OF STEAM**



**BURIED CAN
MAKES A GOOD
MOORING "DEADMAN"**



SIGNAL FIRE

**ENGINE-COWL
REFLECTORS**

**HUB-DEEP
HOLES FOR CHOCKS**

**BURIED LOG
MAKES A
GOOD MOORING
"DEADMAN"**

**"IF YOUR PLANE
IS TO SERVE AS
LIVING QUARTERS
COVER OPEN DOORS
AND HATCHES
WITH MOSQUITO
NETTING OR A
SINGLE THICKNESS
OF YOUR
PARACHUTE**

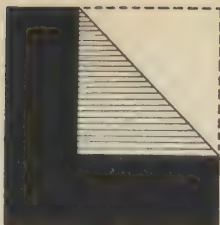
Place bright-colored or reflecting objects on the wings and around the plane. Cowl panels removed from the engine nacelles and placed upside-down with their unpainted surfaces pointing up form good reflectors. Line them up side-by-side on the wings where they can reflect the sun and will be readily visible from the air.

Lay several fires within a few hundred feet of the plane, so they can be lighted when a rescue plane is sighted during the day or heard at night. Place a small can of engine oil and a can of water near one of the fires—engine oil thrown on a fire will produce black smoke, water will send up billows of steam.

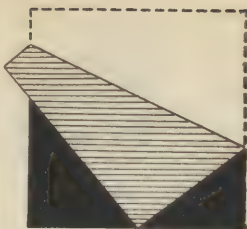
Do everything that you can to make the plane stand out against its background. Remember, your plane is a green-brown that by design is a good match for the ground. Objects whose colors contrast with that of the trees and grass, such as orange life-preserver cushions, will stand out against the background if they are put out on the fuselage and wings where they can be seen.

If you have an emergency kit or a life-raft kit, use the large yellow-and-blue panel to signal to rescue planes. Fold over the corners of the panel as shown on the following pages to transmit the corresponding messages.

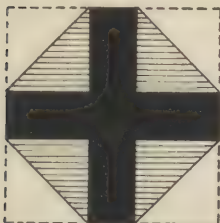
PANEL SIGNALS



**Need Gasoline and Oil
Plane is Flyable**



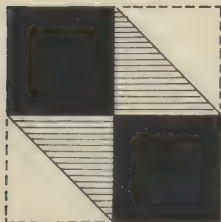
**Need Tools
Plane is Flyable**



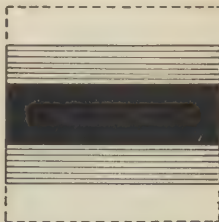
**Need Medical
Attention**



**O K to Land—Arrow
Shows Landing Direction**



**Do Not Attempt
Landing**



**Indicate Direction of
Nearest Civilization**

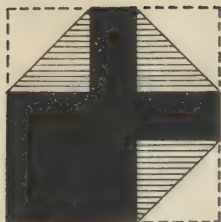


Blue



Yellow

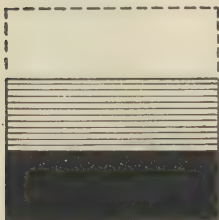
PANEL SIGNALS



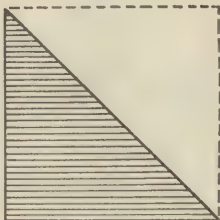
**Need First-Aid
Supplies**



**Need Quinine
or Atabrine**

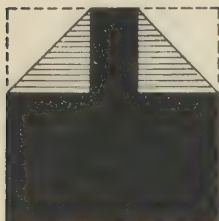


**Should We Wait
For Rescue Plane?**

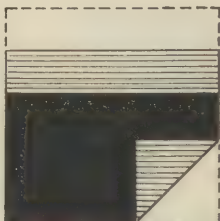


**Need Food
and Water**

←USE BLUE
ON LIGHT
BACKGROUND



**Need Warm
Clothing**



**Have Abandoned Plane,
Walking in this
Direction ➡**

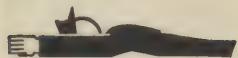
Blue



Yellow



BODY SIGNALS



**Need Medical Assistance
URGENT**

Once you have sighted a rescue plane and attracted the attention of the pilot, the body signals on this and the following page can be used to transmit messages.



**All O K
Do Not Wait**



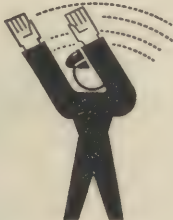
**Can Proceed Shortly
Wait If Practicable**



**Need Mechanical Help
or Parts—Long Delay**



**Pick Us Up—
Plane Abandoned**



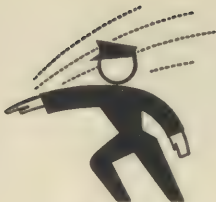
**Do Not Attempt
To Land Here**



**Land Here (Point in
Direction of Landing)**



**Our Receiver
Is Operating**



**Use Drop
Message**



**Affirmative
(Yes)**

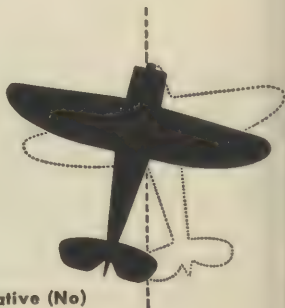


Negative (No)



Affirmative (Yes)

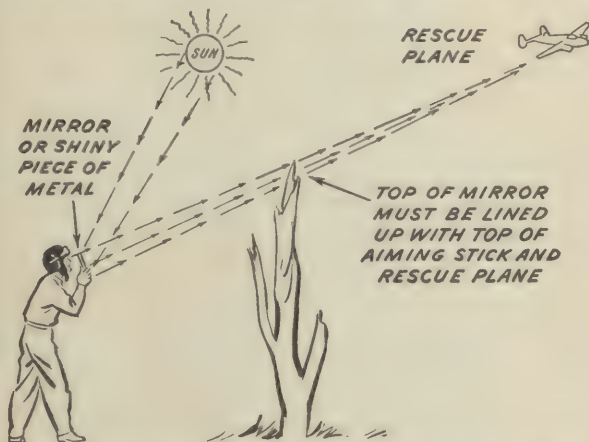
BODY SIGNALS



Negative (No)

MIRROR SIGNALS

When the sun is shining, a mirror or any piece of shiny metal—your rear-vision mirror, a food tin, or a piece of metal from the plane—can be used as one of the best of all signalling devices. However, the mirror must be accurately aimed if the reflection of the sun in the mirror is to be seen by the pilot of a passing plane. One of the simplest ways to aim a mirror is to use an aiming stake as shown below. Any piece of wood four or five feet long can serve

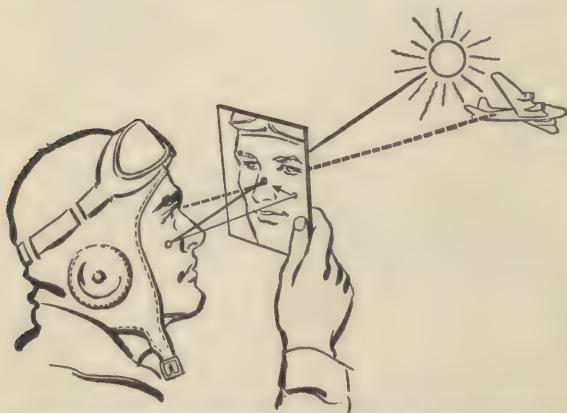


How an aiming stake can be used to aim a mirror for signalling

as the stake, or one of your party can stand in position.

Hold the mirror so you can sight along its upper edge. Change your position until the top end of the stick and the plane line up, then adjust the angle of the mirror until the beam of light reflected by the mirror hits the top of the stick. If stick and plane are then kept in the sighting line, the reflection will be visible from the plane.

Some emergency kits are now fitted with a special signalling mirror, which is a double-faced mirror



If your kit contains a mirror with a hole in it, use as above

(*i.e.* mirrored on both sides) and provided with a sighting or aiming hole. If you have one of these mirrors, use it as shown on the opposite page.

Hold the mirror about three inches away from your face and sight at the plane through the sighting hole. The light from the sun shining through the hole will form a light spot on your face and this spot will be reflected in the rear surface of the mirror. Then, still sighting on the plane through the hole, adjust the angle of the mirror until the reflection of the light spot on your face in the rear mirror just coincides with the hole. In other words, when the reflected spot disappears and the plane is still visible through the hole you can be sure that the reflected light from the sun is accurately aimed at the plane.

Divide the general duties among your crew. It will help to prevent fears and panic. Post a guard every night. If you are reasonably sure that you are not within, or dangerously near, enemy-held territory, the guard should keep a signal fire going continuously. This will conserve your signal-pistol ammunition or flares for the more important job of signalling a rescue plane when it is actually heard or sighted.

Fix your location by compass, octant, or the stars. Make scouting trips out from the plane in search of

STRAIGHT AHEAD



TURN RIGHT



TURN LEFT



Mark a trail, it will keep you from wandering around in circles

streams, making sure to mark a trail in the form of knife cuts on trees, bent branches, arrows, or bits of paper or cloth. Never go any distance from the plane without laying some sort of trail that can be followed back.

IT IS VERY EASY TO ROAM IN CIRCLES IN THICK FOREST OR JUNGLE.

WATER

If you find a stream, make careful note of its direction and position from your camp. It will not only provide you with water for drinking, washing, and

cooking, but it may lead you to civilization when you decide to give up hope of rescue and start to walk your way out.

If you can't locate a stream for drinking water, dig a hole in the lowest depression near your camp. If you don't strike water down three or four feet, try another spot. Unless you are on high ground, water should be located in a few tries.

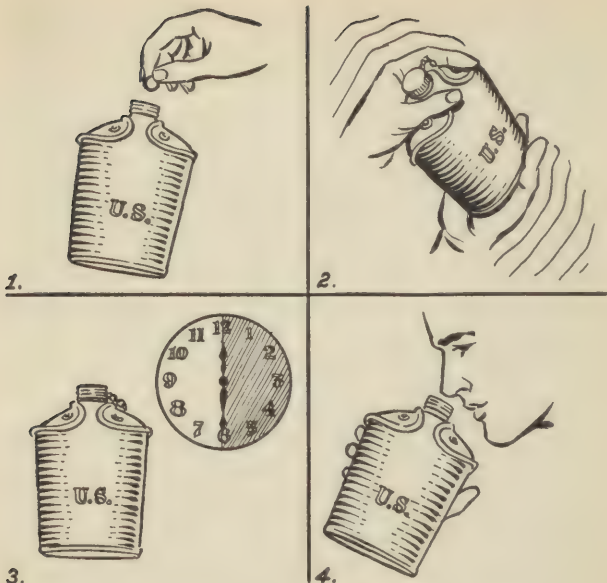
Animal trails will eventually lead you to water if you are careful not to get lost in the maze of intersecting paths.

ALL ANIMALS, WITH FEW EXCEPTIONS, TRAVEL TOWARDS WATER AT DAWN AND DUSK.

WARNING: All water for drinking must be purified either by boiling for three minutes or by treatment with Halazone tablets (or iodine if Halazone tablets are not available).

Although not as effective as Halazone, tincture of iodine can be used as an emergency water purifier. Add three drops of iodine to every quart of water which has previously been boiled and cooled. After adding the iodine, stir the water thoroughly and allow it to stand for thirty minutes before drinking.

Be especially suspicious of water around native villages or what looks like the remains of a native village. The water is probably polluted.



PURIFYING WATER WITH HALAZONE. Pour water into a canteen or other container until it is within a few inches of the top. Then drop one Halazone tablet in for each quart of water, insert stopper, and shake the container. After a half hour, shake the container and remove the stopper. If a slight odor of chlorine can be detected, the water is ready for drinking. If chlorine cannot be detected, add one or two more tablets and repeat the process. Keep your supply of Halazone tablets in a dark, dry place—moisture and exposure to light cause them to lose their strength.

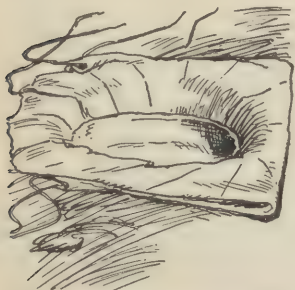
If no natural source of water can be found immediately, two common jungle plants will provide watery saps that are thirst quenchers.



A water substitute can be found in the stems of Lianas, above...



Grape vines, above, and large rattans. Cut stem, drink sap



Rain water can be collected by digging hole, lining with 'chute



After a rain, water can be collected from tips of large leaves

The stems of Lianas, Jungle grape vines, and large rattans contain a good water substitute. Cut them near the ground and drink the sap.

In forests, rain water often can be collected by digging a hole and lining it with your parachute. Also, the large lower leaves of trees collect a great deal of water which can be drained off after a heavy rain.

PARACHUTE

Save your parachute, or as much of it as you can. The shrouds cut loose can be braided into a strong rope and the canopy can be cut and folded to form a good tent. A single parachute shroud line has a minimum breaking strength of several hundred pounds, so a double strand will be strong enough to carry your weight with plenty of strength to spare. However, shroud line will chafe easily when run over rocks or tree bark.

Save your parachute pack—it can be converted into a handy knapsack for carrying tent, kit, and other supplies. The pack forms the base of the knapsack and the web straps form the shoulder straps.

Additional equipment can be carried in your gas-mask bag.



SAVE YOUR PARACHUTE—the canopy makes up into a good tent



... and the pack makes a knapsack by cutting off the shaded parts



Don't wear wet clothes. Dry them on a drying rack of crossed sticks

CLOTHING

If you were able to land your plane, check your equipment carefully before leaving for your trek back to civilization. In jungle travel it is important to keep as dry as possible. If you have them, include extra shirt, pants, underwear, and socks in your kit in spite of the weight they add. The jungle's high temperatures and high relative humidity will make you sweat freely and any rapid cooling of your sweat-wet body should be avoided. Chilling due to the rapid evaporation of the sweat reduces body resistance and

can be the cause of pneumonia, bronchitis, stomach cramps, and skin infections like fungus and prickly heat.

Wet clothing should be changed for dry as soon as practical. If you have no change of clothing, build a fire, strip, rub your body, arms, and legs vigorously to dry them and increase the circulation of your blood and then remain naked until your clothes dry.

Avoid tight-fitting clothing—it is hot and constricts your movements. If you have your choice, cotton shirts are better than wool, they are cooler and more resistant to snagging and fungus rot.



Bundles of food or life rafts can be carried on a pole by two men

If you have a pair of gloves, take them with you. They will protect your hands against burrs and nettles and also provide mosquito protection.

LIFE RAFTS

If you are travelling as a group, take your life rafts with you. They can be floated on jungle streams and can be used for transporting equipment if not yourselves. They can be separately wrapped in canvas and swung on poles that can be carried by two men.

BEFORE LEAVING YOUR PLANE BURN ALL PAPERS, TECHNICAL ORDERS, AND TRIP DATA THAT MIGHT BE RESTRICTED, CONFIDENTIAL, OR CLASSIFIED. SECRET INSTRUMENTS SHOULD BE SMASHED AND THE PARTS BURIED.

IF YOU ARE IN OR NEAR ENEMY TERRITORY, BURN THE PLANE.

PART THE JUNGLE, DON'T TRY TO PUSH THROUGH IT

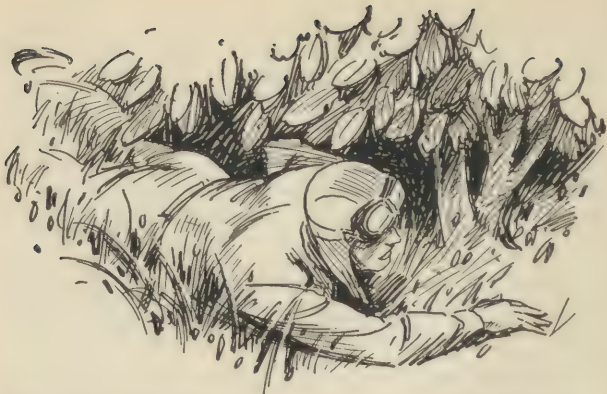
Travel in the jungle forests is slow. Try to follow a stream downstream, and try as far as possible to stick to natural trails, or native trails. Don't try to break your way through. Blundering ahead only leads to bangs on the head and thorn scratches on your face. You will get through faster if you watch your step and pick your way. Keep your head up and your chin in.

If you can't find a stream or a native trail, follow the swampy hollows which generally run in chains and eventually join a stream.

In hilly country, the ridges are easier to follow than the valleys, but precipices may make long detours necessary.

In elephant country, follow the elephant trails. Elephants do not wander aimlessly. If a track shows frequent use, follow it. Elephants never go where they are likely to fall or get bogged. Elephant trails are 3 or 4 feet wide, other game trails are a foot to 18 inches wide.

You can't look through the jungle, but sometimes you can look under it. The heavy growth of foliage generally ends about a foot above the ground. Often



You can't see through the jungle, but often you can see under it

you can see much more of your surroundings by getting flat on your stomach than you can by standing up.

Rely on your compass and your map, but don't try to follow a direct compass line. It will take too long and be too tiring.

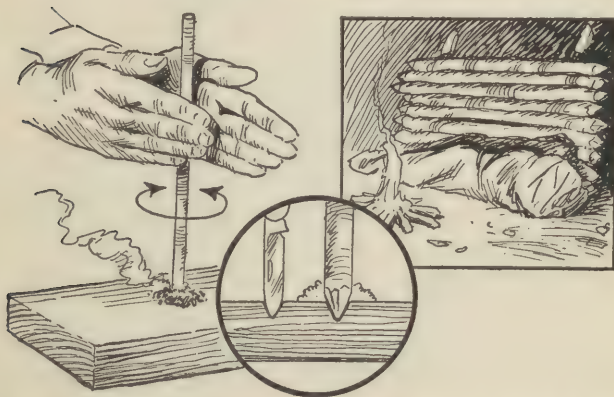
Do your walking early in the day. Darkness comes early in the jungle. By five in the afternoon very little light can penetrate through the thick foliage. Start looking for a place to camp around three or four.

Take plenty of time for sleep and rest. Don't force yourself beyond your physical limits.

CAMPS

In picking a camp each night, avoid the banks of streams and rivers. Pitch your tent back a few hundred feet. Try to find a slight rise in the ground. Half way up a hill is a good place to camp. If jungle growth separates you from the stream or river, all the better.

Build yourself a fire every night. Wood is plentiful,



A simple fire maker. Fuzz scraped from palm leaves is good tinder. At right, a log reflector increases the heat from a fire

and even in rain forests comparatively dry wood can be found hanging in the network of vines and rattans. Any standing dead trees will be dry even if it is raining, only the outside will be wet. Wet wood can be used by splitting it and digging out the heart wood. For tinder, if you are in palm country, simply scrape the fuzz from the bottom sides of palm leaves.

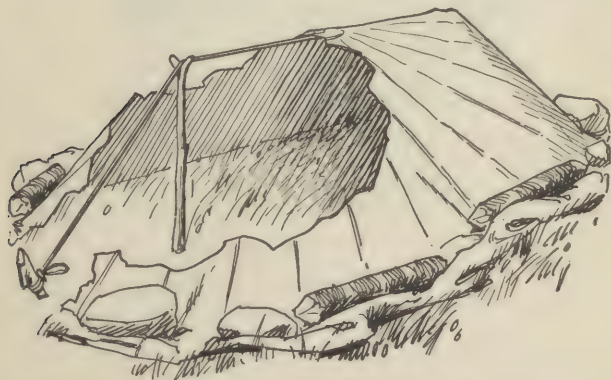
A simple fire maker can be made from a flat stick of soft wood and a foot and a half length of fairly hard sapling about $\frac{3}{8}$ -in. in diameter. Bore a cone-shaped hole in the stick with your knife and whittle a similarly shaped point on the end of the sapling. To start a fire put the point of the sapling in the hole, pile your palm leaf tinder around it, and twirl the stick back and forth between the palms of your hands until the tinder catches.

Before settling down for the night, gather a good supply of wood for the fire and stow it inside the tent where it will be protected from the rain.

Build your fire small. It will take less wood and yet furnish enough heat for cooking. Any one of a number of types of fires can be used. Nearly all natives in the tropics—African, Australian, and East Indian—arrange the wood in a radiating pattern, like the spokes of a wheel. Such an arrangement provides a steady uniform fire.

WILD ANIMALS

In just about ninety-nine cases out of a hundred, jungle animals will be just as frightened of you as you are of them. They will hear you long before you can see them and in most cases they will do their best to keep out of your path. If you are traveling alone and want some form of protection at night in a particular area where you feel large animals are present, build a fire and pile on bamboos. They will go off like gunshots and make enough noise to scare away any animals that may be nearby. In



Another type of parachute tent. In districts where there are ground bugs, fold the 'chute to form a floor covering

an emergency, a shot from your signal pistol will scare off an angry elephant or a tiger.

WARNING: *One of your worst enemies in the jungle is the mosquito.* Never go to sleep without some sort of protection—regular netting if you have it or your parachute. Either cover the upper part of your body with it, taking care to see that your hands and face don't touch the netting, or use it as a covering for the door to your tent. If it is used as a door covering, be sure to kill all mosquitoes inside the tent after you have closed the netting door. As an additional precaution, apply mosquito repellant to your face and hands if you have it. Put a good quantity behind your ears.

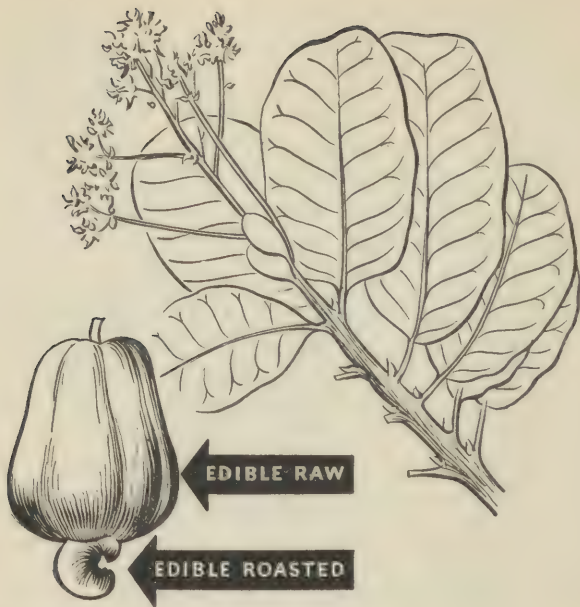
NATURAL FOOD

Natural food is plentiful in most jungles if you know where to look for it and are able to distinguish between the edible and the poisonous. There are only three general rules beyond definite recognition—

EAT NOTHING THAT HAS A BITTER TASTE UNLESS YOU ARE SURE WHAT IT IS.

AVOID ALL PLANTS THAT HAVE A MILKY SAP.

ANYTHING THAT YOU SEE MONKEYS EAT, YOU CAN EAT.



CASHEW

A small or medium-size tree. The upper, yellowish or purplish fruit, with the exception of the extreme lower tip, is refreshing and can be eaten raw. **WARNING:** The lower seed, the cashew nut, should be roasted before eating.

CASSAVA

A shrubby plant about four feet high with tuberous roots rich in starch. **WARNING:** There are two kinds of cassava—bitter cassava and sweet cassava. Sweet cassava roots can be eaten raw. **BITTER CASSAVA IS POISONOUS RAW, IT MUST BE COOKED.**



GUANABANO TORETE

Guanabano, a tree that grows to a height of twenty-five feet, is common in Central America. The fruit, which has a brown skin, orange-colored meat, and large flat seeds can be eaten raw. It is neither meaty nor overly nutritious.





HOGPLUM OR CIRUELO

The hogplum tree bears fruit that is reddish orange when ripe and resembles a small plum. It can be eaten either raw or cooked. It is most common in Central America.



NISPERO

The tree grows about fifty feet high and has dark green leaves. The fruit is small and ball-shaped and has a thin brown skin. It can be eaten raw only. Although the milky sap of the tree is not poisonous, it is **NOT A GOOD SUBSTITUTE FOR WATER.**

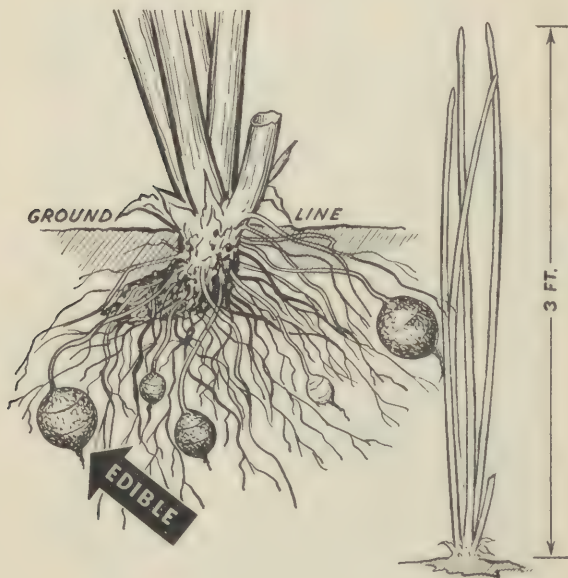
STAR APPLE

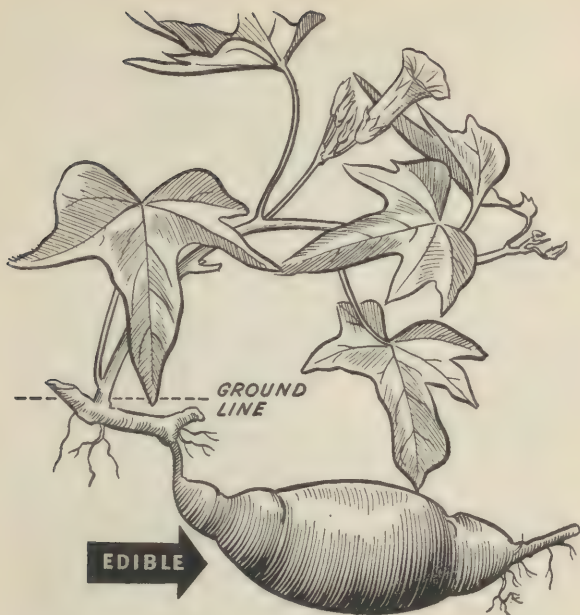
The star apple tree grows to a height of about sixty feet and has dark green, shiny leaves. The fruit resembles a small apple and when cut through its brown seeds form a star. It can be eaten raw only and has a sweet taste.



WATER CHESTNUT

Water chestnuts, common to the Far East, grow in swampy watery places. Their stalks grow to a height of about three feet. The chestnuts are a part of the root system. They are best when eaten cooked.





YAMS OR YAMPI

A vinelike plant common in the forests, not unlike the sweet potato. Their large tuberous roots can be eaten when cooked.



BANANA

The banana tree is easily identified by its large long leaves and its familiar cluster of fruit. Green bananas make a good substitute for potatoes when they are boiled.

MAMEY

The tree often grows to a height of sixty feet and has a top of glossy leaves. The fruit is brown, has a yellow or reddish meat, and resembles a peach in taste. It can be eaten raw or cooked.



PAPAYA OR PAPAW

A straight-trunked tree bearing melon-shaped fruits in clusters like coconuts. The fruit is excellent food and can be eaten raw or cooked. The young leaves and stems also can be eaten if boiled in several water changes to remove the bitter taste.





PINEAPPLE

Although generally cultivated, pineapples are often found growing wild in Central and South America. The fruit is located in the center of the plant.

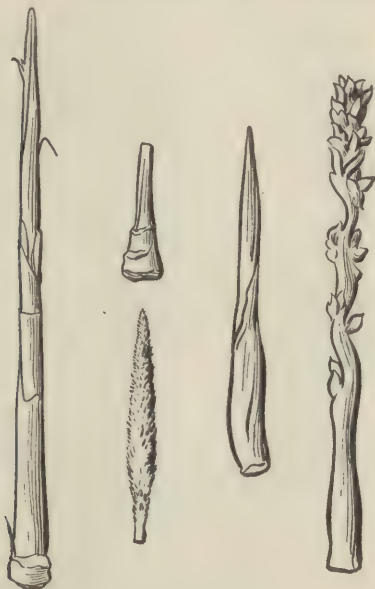


RATTAN

Rattans are a good source of both food and a substitute for water. The tender spike at the upper end of the vine is edible both raw and cooked and the sap of the larger vines is drinkable. A man can exist for a considerable time on nothing but rattans.

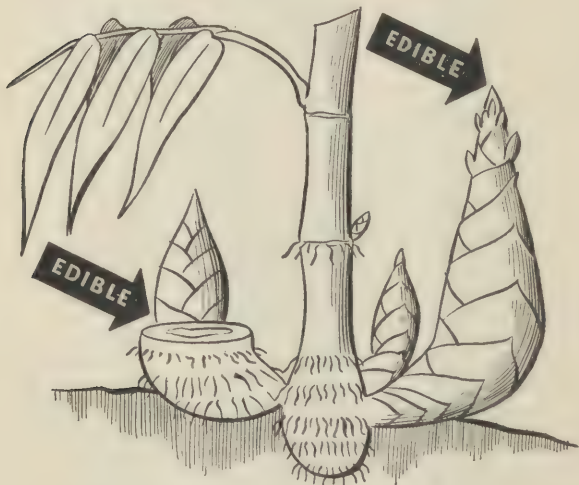
PALM CABBAGE

The spike or terminal bud in the center of the leaf cluster of a palm tree is called the "palm cabbage." Like the rattan spike it forms a plentiful source of food. It can be eaten either raw or cooked.



BAMBOO SHOOTS

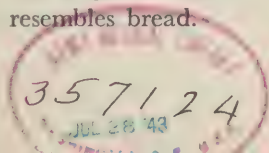
Bamboo shoots are the spikelike young shoots growing out from the base of the bamboo. The shoots can be cut off at the ground level. They can be eaten raw but are best when cooked.





BREADFRUIT

The breadfruit tree often grows to a height of forty feet. The fruit, about a half-foot in diameter, grows near the ends of the tree's branches. It is starchy and provides a good substitute for potatoes. Baked, the fruit resembles bread.





COCONUTS

Besides the meat and drinkable milk of the coconut itself, the coconut palm also provides a good source of food in the form of its large terminal bud or shoot in the center of its leaf cluster. This bud is the “cabbage” and can be eaten raw or cooked.

DURIAN

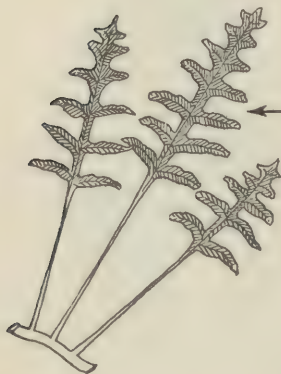
Durian are plentiful on most East Indian Islands. The eight-inch fruit has a prickly rind and a soft creamy pulp that is not only edible but considered a delicacy. Don't let the odor of the pulp bother you. The seeds can be roasted and eaten.



GROUND FERNS

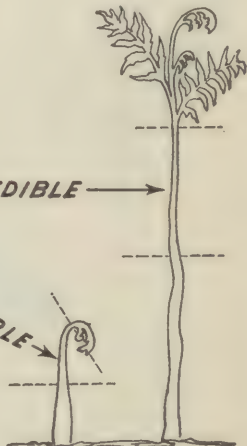


The young shoots of most ferns growing along swift streams and rivers are edible. Boiled, they resemble spinach in taste. They also can be eaten raw.



← EDIBLE →

EDIBLE →





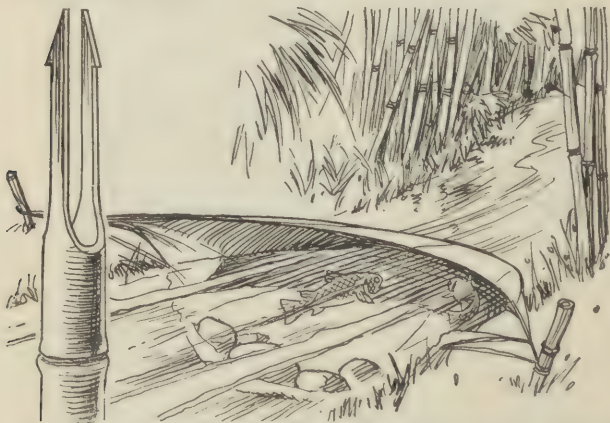
SWEET POTATO

Although generally cultivated, sweet potatoes often can be found growing wild. In addition to the edible tubers or roots which can be eaten either raw or cooked, the young shoots and leaves when boiled resemble spinach in taste.

FISH

Fish are easy to catch in most tropical streams. A hook and line will generally bring results, but since many tropical fish are suckers, a spear made by whittling sharp double points on a bamboo shaft or a small sappling will yield more food in less time.

If both of these methods fail, your parachute-tent can be used as a fish net. On small streams it can be spread across a narrow portion to trap fish as they swim downstream.



Your parachute can serve as a fish net and a spear can be made from bamboo

Don't eat any fish that have spiny or leathery skins. Skin *all* fish and frogs before cooking.

FISH SHOULD ALWAYS BE BOILED. Boiling is not only a precaution against infection due to pollution of the water in which the fish was caught, but it retains more of the food and vitamin value of the fish than either frying or baking.

BIRDS AND ANIMALS

Ground birds and small jungle animals provide a good food source, but they require more time to catch and prepare than fish. The most common are ground pigeons, turkeys, jungle rats, and monkeys.

Simple snares and traps are about the best means of catching these animals. They can be set out at night when you make camp and taken up in the morning before setting out again.

Don't overcook your meat, and use as much of the animal or bird as you can. Entrails, the heart, the liver, and the kidney contain essential vitamins that will make up for any possible lack of greens and roughage in your diet.

As with fish, meat should be stewed rather than fried or baked. Chunks of meat one or two inches across should be dropped into a pot of cold water over the fire. Two minutes after the water has come

to a boil remove the pot from the fire and place it to one side to cool to eating temperature. This permits the meat to cook thoroughly yet prevents over-cooking.



Three monkey traps. Top, a coconut with a small hole in each end and fastened to the ground by wire or cord. Bait is placed inside. Monkey reaches in, closes fist, and won't let go even though he can't pull fist through hole. Bottom left, tip-up trap—monkey climbs inclined pole to reach food hanging on cord, pole tips up dropping him into pit. Bottom right, Monkey reaches for bait, trips trap, sapling springs back holding monkey. Bait should be walled in at back and sides with rocks or logs to force monkey to reach in through the loop.

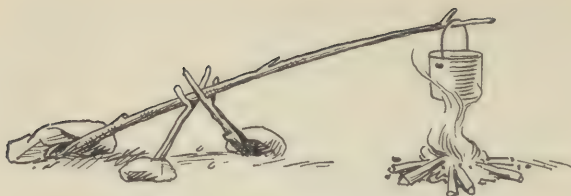
If you have no cooking pots, food can be baked by wrapping it in several layers of green leaves and burying it in hot ashes, keeping the fire on top burning until cooking is completed.

A similar but cleaner method is to place a number of stones which have been heated very hot in a fire in the bottom of a shallow, dry trench scooped in the ground. Cover the stones with green leaves, place the leaf-wrapped food on the leaves, surround it closely with other hot stones, and cover the whole thing with more hot stones and a light topping of dirt. It will take about two hours for most foods to cook.

GAME OR FISH can be cooked on an improvised spit or stick.

FAT

Fat should be part of your diet. Save unused fat from animals killed. Don't waste it. Starchy foods are easily obtained in most jungles, but proteins and fats are not. It may not always be possible to get birds and animals, so a reserve of protein and fat should be carried. Melt the excess fat in a pan, boil it for a few minutes, skim off any solid material, and pour it into a small can with a tight-fitting top—one or two empty friction-top coffee containers from



your emergency ration kit will serve nicely. The fat then can be used for preparing starch plants and other foods.

EDIBLE INSECTS

In emergencies, two groups of jungle insects form a nourishing food source—

TERMITES



After removing the wings, termites can be eaten raw or cooked. Grasshoppers and crickets also can be eaten raw or cooked.



and BEETLE GRUBS

Beetle grubs can be eaten either boiled, fried, or dried. They are generally found inside dead stumps and rotted fallen trees.

In most clearings and grasslands Termites emerge from the ground and can be picked up by the handful after a heavy rain. After removing the wings they can be eaten raw or can be fried in fat. Considered delicacies by jungle natives and many explorers, they not only provide considerable nourishment, but raw or cooked have a taste like roasted chestnuts. Grasshoppers and crickets also can be eaten.

Beetle grubs are also a favorite native food. They can be found easily by hunting out dead stumps and fallen trees and listening for the scratchings of grubs inside the wood. Once grubs are located, split the log with your jungle knife and remove them. Dried in a pan suspended over a fire, they can be eaten as they are, as part of stew made up of one of the starch root plants, or they can be fried with a little salt and fat.

POISONOUS PLANTS

The number of poisonous plants is not great, and few are common in the jungles and forests. Four are shown on the following pages. A safe rule to follow is to eat nothing that a monkey won't eat, and avoid all those that have a milky sap or a disagreeable taste.



POISONOUS

SANBOX

The tree grows tall and has a trunk covered with spines. The fruit is about four inches in diameter and resembles a small pumpkin, being green when unripe and brown when ripe. The seeds contain an oil that is a violent cathartic.

MANZANILLO

Manzanillo is found near the seacoasts along beaches. The bark is smooth and tan, the leaves are green, and the fruit resembles a small green apple. The fruit is poisonous and even the sap of the tree can cause severe inflammation and irritation.



POISONOUS

COWITCH

A plant common in thickets. The beanlike pods are not edible and should not be touched. They are covered with short, fine detachable hairs that will stick into your skin, become detached from the pod, and cause severe irritation.

POISONOUS



VERY POISONOUS



STRYCHNOS

A slender, woody vine bearing ball-shaped fruit about two inches in diameter. It contains one of the deadliest poisons known — a small amount in the blood stream being sufficient to paralyze the nerves and cause death. Common in South America, it has been used by natives to poison arrows.

JUNGLE HEALTH

Three things are absolutely necessary to your health in the jungle—periodic doses of Quinine or Atabrine, a Quinine substitute, the use of some sort of mosquito protection, and daily doses of salt or salt tablets to replace the salt removed from the body by excessive sweating.

MALARIA

Atabrine must be taken for protection against the fever symptoms of malaria. Take the first dose (1 tablet) in the morning, and the second dose (1 tablet) in the evening on the first day you are in the jungle. Skip three days, then repeat the doses as on the first day. Keep this up as long as you are in a malarial area. (This dosage for 1½ gr. Atabrine tablets.)

If Quinine is in the jungle kit instead of Atabrine, take two 5 gr. tablets each day, as long as you are in a malarial area.

DYSENTERY

Dysentery is caused by impure drinking water or food and is very likely to occur in the jungle. It can be avoided by purifying all drinking water, and by eating only food which has just been cooked or taken from a sealed container. If you become ill with dysentery, take only liquid foods and stay as quiet as possible until you are well. Add two salt tablets to each canteenful of drinking water.

If your first aid kit contains sulfaguanadine tablets take 4 tablets every 4 hours, day and night, until your bowel movements are normal. If there is no improvement in 4 days, stop taking the tablets.

SNAKE BITE

Snake venom acts rapidly. First-aid must be given quickly to prevent the poison from spreading throughout the body.

Put a tourniquet on at once, placing it between the body and the bite. Apply it above the knee in foot or leg bites, above the elbow in hand and arm bites. A necktie, belt, handkerchief, or bandage can be used as a tourniquet.

THE TOURNIQUET SHOULD BE LOOSENEED FOR TEN OR FIFTEEN SECONDS EVERY TWENTY MINUTES.

Apply iodine around the bite, treat your pocket knife blade tip or razor blade with iodine, and make cross incisions $\frac{1}{4}$ -inch long and $\frac{1}{4}$ -inch deep across each fang mark. Then apply suction to the wound for twenty minutes before loosening tourniquet and keep up suction for at least three twenty-minute periods. This can be done by mouth if you have no snake bite kit. Spit fluid out.

After the wound has been sucked for an hour, remove the tourniquet, apply iodine or sulfanilamide powder if you have it, and apply a clean bandage.

JUNGLE PESTS

Mosquitoes as carriers of malaria, yellow fever, dengue (or breakbone fever), and filariasis are not the only jungle insects that should be guarded against. Ticks, fleas, body lice, mites or chiggers, kissing bugs, and botflies are other common jungle pests that carry diseases or cause painful sores. Although not insects, leeches and vampire bats (only in South America) also are dangerous.

REMOVE YOUR CLOTHING TWICE A DAY AND INSPECT IT AND YOUR BODY FOR ANY TRACE OF VERMIN.

TICKS can be identified by their flat oval body, small head, and comparatively large abdomen. They are carriers of relapsing fever and typhus.



Ticks do not always attach themselves immediately after coming in contact with your skin. Even after the biting members are attached, infection usually does not occur until the tick has remained in place for six hours or longer.

Never squash a tick on the skin or attempt to pull it out. Instead, cover it with a good coating of spit. The tick will free itself and be easy to remove. If you try to pull the tick out, his mouth will be left under your skin. Apply iodine to the bite.



FLEAS are small wingless brown or black insects with a flat body, small head, and large legs.

The rat flea found in native villages and storehouses is a carrier of bubonic plague and typhus. Avoid native huts and use your insect repellant.

MITES OR CHIGGERS, very small insects resembling fleas, are common in the American tropics and in parts of West Africa and India. They are carriers of typhus. As with fleas, use repellant and avoid native huts.



Chiggers bore under the skin. They should be removed with a sterile knife-point. The bite should be treated with iodine.



BODY LICE are small, gray, flattened, six-legged, and wingless. They are carriers of typhus, relapsing fever, and trench fever.

To keep from getting lice, avoid close contact with natives and stay out of native huts. It is easy to kill the lice, but the eggs are more resistant. Steaming of the clothing, especially the seams, generally will be effective.

KISSING BUGS are large, dark brown or black, have a narrow cone-



shaped head, oval body, long legs, and well developed wings. Common in Yucatan and Central America, they are carriers of Chagas' disease. Avoid native huts and abandoned buildings. They usually bite you on the face, so again mosquito netting is an important protection.



BOTFLIES, common in the American and African tropics, are dangerous because of their larvae. The

maggot burrows into the skin and causes a painful swelling that looks like a boil. A coating of oil or kerosene placed over the hole every few hours will generally cause the larvae to come to the surface of the skin where it can be expelled by squeezing the skin. Frequent applications of wet tobacco will also kill the larva which can then be squeezed out.

LEECHES, common to ponds or sluggish streams and the East Indian tropics where they cling to low-lying brush and attach themselves to a passing man or animal, look like thick short worms. Unless removed carefully, their bites can produce painful infections.

Do not try to remove a leech by pulling. Instead apply iodine, salt,



or tobacco juice, and it will release its hold and drop off.



VAMPIRE BATS, found in Yucatan and tropical America, often bite humans and are carriers of rabies and other animal diseases that infect humans. Im-

mediate first-aid treatment consists of cauterization of the wound and applications of tannic acid ointment and a tight compression bandage.

JUNGLE NATIVES

With the exception of those in New Guinea and in parts of Assam, there are few dangerous jungle natives. When you encounter natives, try to appear confident but not aggressive. *Stay away from the women.* All natives are superstitious and suspicious. Through generations they have learned to trust no one. You can only win their confidence by appearing openhanded.

String tricks—the cat's cradles and spider webs that you did when you were a kid—are an almost universal pastime with jungle natives all over the world. If you remember any of them, pick up a piece of pliable vine and demonstrate them to natives you meet. In most cases it will serve as an immediate

bond between you and them. If you can't do a string trick, go through the motions to arouse their curiosity.

Be particularly careful of your treatment of natives if you are in or near enemy territory. If they want to, they can help you get back to your lines. Don't try to use terrorist methods to get them to work for you or conceal you. Jungle natives move about a great deal, but if they are not threatened or abused they will seldom rush news of your presence to the enemy.

Eat native food only when it has been well and freshly cooked and be sure all water offered you by natives has been boiled. Under no conditions sleep in or near native camps or bathe in nearby streams. Avoid close contact with any native. Don't go around barefoot.

DESERT

**IF YOU ARE
FORCED DOWN IN THE DESERT
DON'T GET PANICKY.**

**YOUR CHANCES OF RESCUE
ARE GOOD**

LAND YOUR PLANE

IF YOU GET LOST over the desert, and your fuel supply is low, don't fly on aimlessly in the hope of getting your bearings. Almost any place in the desert provides terrain for a good landing and a landing under full control with fuel in reserve stands every chance of success. A forced landing with a dead stick is just as dangerous in the desert as it is in any other kind of country.

Prevailing ground wind directions generally can be ascertained by studying the formation of the sand dunes as you fly over them. Dunes, like ocean waves, usually run roughly at right angles to the direction of the prevailing wind.

Desert weather is variable with temperatures ranging from 125 deg. F. midday in the summer to 25 deg. F. in the early morning hours of the winter. Winds seldom if ever reach hurricane velocities, but winds of 35 miles an hour are common and velocities of 50 miles an hour do occur occasionally. Rains are infrequent, but may be of cloudburst intensity when they do occur. Hailstorms are rare. Thin low ground

fogs occur occasionally in the early morning hours, but they almost invariably clear up when the sun rises. In general, desert flying weather is uniformly good.

Sandstorms are a hazard of desert flying, but landings during a sandstorm are no more difficult than landings during a heavy rain. Such landings invariably will be made into the face of a wind with a velocity of 35 miles an hour or greater—a fact that makes landings even in rough desert terrain possible. Your actual landing speed will be low, and your roll after landing will be short.

If you can land your plane, do so. Even a wrecked plane can provide you with a good many things that will make it easier for you to walk your way out if rescue fails.

STAY NEAR YOUR PLANE until nightfall, or longer, if you expect a search to be made for you. If you bailed out, and your wrecked plane is not too far away, make your way to it—the plane will be easier for rescuers to locate than you.

SIGNALS

Most of the signals suggested in the jungle section on page 7 will serve equally well in the desert. An additional groundstrip type of signal can also be used. It consists of scratching shallow trenches in the sand to form large letters, pouring gasoline into the trench, and lighting it when a rescue plane is sighted. The smudge formed will be visible from the air as a message.

If you are equipped with an emergency parachute kit, use the colored signal marker as outlined on page 10. If a plane is heard at night, light your signal fires or flares or fire your signal pistol. If a plane is sighted during the day, signal it with a mirror or any piece of shiny metal. Properly aimed it will be more effective than fires. (See page 15.)

GO OVER YOUR PLANE CAREFULLY, there are a number of things that you can take with you to make travel easier.

DON'T FORGET:

ALL WATER AND FOOD . . . and water is more important than food.

SUN GLASSES. They will protect your eyes from the sun and from blowing sand.

SALT TABLETS.

MAPS.

MATCHES.

EMERGENCY KIT.

FIRST-AID KIT.

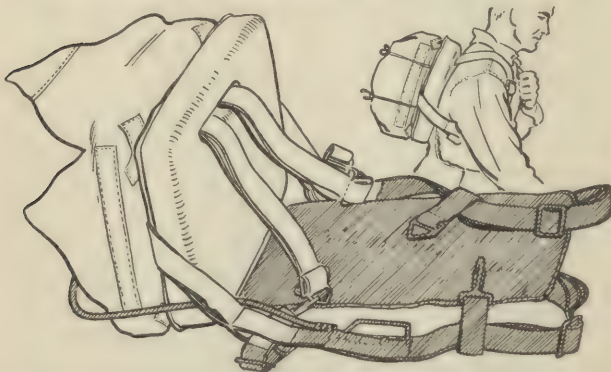
SIGNAL PISTOL OR FLARES.

WARM CLOTHES OR A BLANKET. In spite of the terrific heat during the day, night temperatures often drop as low as 25 deg. F. in the winter.

OCTANT AND COMPASS. If the small compass in your kit has been broken or lost, remove the compass from the instrument panel of your plane. The desert is one place where you can't trust to instinct. To get where you want to go, you will need all the navigation aids available.



Stay under cover during the day. Use your 'chute as a tent



Cut away the shaded parts to make a knapsack from a 'chute pack

A good tent can be made either by folding your parachute canopy or by cutting a ten-foot square from it. Save the shrouds, they can be used as stake lines, bindings for an improvised knapsack made from your parachute harness, and as a line for bailing water out of Bedouin wells which sometimes are more than 200 feet deep.

CLOTHES

Don't let the midday heat of the desert fool you. The desert sun can burn you quickly, and desert nights can be cold. In consequence, wear light clothes that cover your body when it is necessary for you to be out in the sun during the day, and wear something warm at night. Your parachute can serve a double purpose here—as a shelter from the sun during the day and as a shawl for warmth during the night.

One very important piece of clothing is an improvised woolen band that can be worn around your middle and over your stomach to prevent stomach chills. This is particularly important in summer, and the hotter the day the more important it is. The purpose of the band is to absorb your perspiration and prevent any rapid chilling of your stomach due to sudden evaporation.

Take care of your shoes, and wear two pairs of

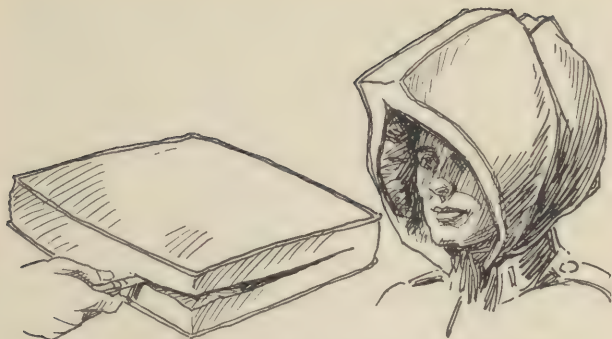
socks if you have them. The condition of your feet may mean the difference between getting back and not getting back. Keep your shoes free of sand and take them off during the day when you are resting under the shelter so they can dry out.

If your shoes are thin, reinforce them by lacing on an outer sole improvised from the rubber floor matting in the cockpit.

Unless you are wearing boots or high shoes, fashion a pair of gaiters or leggings from strips of fabric torn from your parachute or from your plane. Roll the strips spiral-puttee fashion so they cover an inch or two of the shoe tops and two or three inches



Spiral gaiters of parachute cloth will keep sand out of your shoes



**A length of shroud line or fish line can be used
to hold it on your head**

of your legs. These improvised wrap leggings will keep the sand out of your shoes.

An effective sun hat can be made from a seat cushion. Slit it open between the seams on two adjacent sides. Slit through the stuffing, and mold a hollow for your head in the filling. A piece of shroud line, or a length of fishing line from your emergency kit, can be used as a chin strap to hold it on your head. It may make a funny looking hat, but it will protect your head from the sun when it is necessary for you to be out in the open during the day.

GETTING OUT

When you feel there is no longer any hope of rescue, lay out a plan of travel and then make up your mind to stick to it. Distances in the desert are deceptive. Once you have established your position, consult your maps and plan to make your way toward some known route of travel, a source of water, or an inhabited area. Follow the easiest route possible. Avoid soft sand and rough terrain.

Before you leave your plane, make sure that you have the things you will need. If it is a question of carrying either food or water, **LEAVE THE FOOD AND TAKE THE WATER.** You can live on a minimum of food, but you can't live in the desert without water.

BEFORE LEAVING YOUR PLANE BURN ALL PAPERS, TECHNICAL ORDERS, AND TRIP DATA THAT MIGHT BE RESTRICTED, CONFIDENTIAL, OR CLASSIFIED. SECRET INSTRUMENTS SHOULD BE SMASHED AND THE PARTS BURIED.

IF YOU ARE IN OR NEAR ENEMY TERRITORY BURN THE PLANE.

Do your walking at night and stay out of the sun and rest during the day. Stay under the shelter of your improvised tent, particularly during midday. Conserve your strength. The slightest exertion will increase your sweating and increased sweating will increase your thirst.

If you get caught in a sandstorm, put on your sun glasses, cover your nose and mouth with cloth (a strip of your parachute will do) and try to get in the lee of any shelter that may be available. If you lie down, move about frequently so you won't be buried under the swirling sand.

WATER

Your life in the desert depends on your water supply. Protect it and conserve it. Sip water, never gulp it. Your first cravings can be lessened by merely moistening your mouth and throat at intervals. Water consumed rapidly is merely thrown off as excessive sweating and therefore wasted. Take your salt tablets regularly if you have them with you, the salt will make up for the loss of body fluids. If you begin to feel particularly weak add two salt tablets to your canteen of water.

Don't smoke, particularly during the day. Smoking only increases your thirst.

Water from desert water holes and wells should be purified either by boiling for more than three minutes or by dissolving at least one Halazone tablet to each quart (more than one tablet may be necessary). Iodine also can be used as a purifier if you have no Halazone tablets. (See page 20.)

FOOD

Food spoils quickly in the desert. Canned emergency rations should be eaten as soon as the cans are opened.

Unfortunately, game is neither abundant nor uniformly distributed in the desert. In the immediate vicinity of a water hole, or where there is a light growth of brush, such game as rabbits, antelope, and birds may be found in limited numbers. However, in localities where there is nothing but drifting sterile sand, not even snakes and lizards can survive.

Palms around water holes do provide a good source of food in the form of the palm cabbage, a tender shoot which extends up from the top of the trunk at the point where the leaves spread out. (See page 47.) It can be eaten raw or cooked.

When you get to a native camp or inhabited area, avoid native foods prepared by natives. Instead buy or barter for raw food and prepare it yourself by

boiling. Almost all native-grown fruits and vegetables are contaminated; boiling will make them safe for eating. Likewise, milk as well as water provided by natives should be boiled before drinking.

DESERT HEALTH

HEATSTROKE, or sunstroke as it is sometimes called, usually is caused by exposure to the direct rays of the hot desert sun, but it can hit a person who has been under cover. The symptoms are headache, dizziness, red and purple spots before the eyes, and very often vomiting and unconsciousness. The skin is hot and dry, and the face is flushed and feverish. Generally, the pupils of the eyes will be smaller than usual.

A heatstroke victim should be placed in the shade and all clothing with the exception of his underwear, should be removed. He should be placed on his back with his shoulders raised and should be cooled by pouring whatever water can be spared over his body and fanning him to increase the evaporation. His arms, legs, thighs, and trunk should be rubbed briskly. When he regains consciousness he should be given cool water containing two salt tablets to a canteenful. If his skin gets hot again, the process should be repeated.

HEAT EXHAUSTION. An all-in feeling, dizziness, nausea, and weakness are the first signs of heat exhaustion. The face is pale and the skin cold. There is severe sweating. Fainting may occur.

A heat-exhaustion victim should be removed to the coolest, shadiest place available, placed on his back, and given from three to five canteenfuls of cool salt water (two salt tablets to each canteenful) during the next twelve hours.

HEAT CRAMPS. Heat cramps usually occur after a person has been sweating a great deal, especially if extra amounts of salt have not been taken. They bring on shallow breathing, vomiting, severe weakness, and dizziness.

Heat cramps can be prevented by the addition of salt to the diet, especially on days when you have been sweating a great deal. If cramps already have developed, rest in the coolest place you can find and drink from three to five canteenfuls of salt water (two tablets to every canteenful) during the next twelve hours.

SEE JUNGLE HEALTH (PAGE 66).





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